

REMARKS

The Present Invention

The present invention is directed to a high density woven fabric for air bags.

The Pending Claims

Claims 1-13 are currently pending. Reconsideration of the pending claims is respectfully requested.

Amendments to the Claims

The claims have been amended to point out more particularly and claim more distinctly the present invention. The claims also have been amended to clarify grammar. Specifically, claim 1 has been amended to recite the structural feature "obtained by shrink processing at an overfeed ratio of 0-15%," as supported by the specification on page 6, lines 16-17. No new matter has been added by way of these amendments.

Summary of the Office Action

The Examiner rejects claims 1-13 as being indefinite under 35 U.S.C. § 112. All of the pending claims are also rejected under 35 U.S.C. § 102(b) as being anticipated by, or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over, U.S. Patent 6,135,161 (Nakano et al.).

The Office Action acknowledges the claim for priority but does not confirm receipt of the certified copies of the priority documents. Moreover, the Office Action does not acknowledge receipt of the Information Disclosure Statement (IDS) that was filed on April 15, 2002. The certified copies of the priority documents and the IDS were received by the Patent Office and are docketed in the Patent Office's PAIR system. We have contacted the

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Examiner regarding this situation. The Examiner reports that the IDS and the priority documents are in the official file. Applicants request confirmation of this from the Examiner.

Examiner Interview

Applicants thank the Examiner for the time and courtesy extended to Applicants' representatives John Kilyk, Jr., and Kathleen Helm-Bychowski during the telephone interview on February 4, 2004. The claim amendments and remarks set forth herein are consistent with the discussion during the Examiner interview.

Discussion of the 35 U.S.C. § 112 Rejection

The claims have been amended to more particularly and distinctly recite the present invention. There is nothing indefinite regarding the claims, inasmuch as an ordinary artisan can readily determine the metes and bounds of the claims. Accordingly, the section 112 rejection should be withdrawn.

Discussion of the 35 U.S.C. §§ 102 and 103 Rejections

The Nakano reference discloses a high density fabric having an air permeability of not more than 1.0 cc/cm²/sec, which the Examiner maintains is equivalent to the fabric of the present invention which has an air permeability of 2.5 L/cm²/min. However, the air permeability of the Nakano fabric was determined by JIS L 1096 (6.27.1A), in which the differential air pressure is 125 Pa (0.125 kPa). Because the air permeability of the fabric of the present invention is determined at the very different differential air pressure of 50 kPa, the two fabrics cannot be considered to be the same.

Also, the fabric of the present invention has been specifically woven to have an air permeability index of 1.2 or more. In an air bag, air penetrates the fabric due to inner pressure. As that pressure gets larger, the edge of the fabric is deformed by the inner pressure to give higher air permeability to the fabric, but this variation in air permeability will differ

depending on the woven fabric. The relationship between air permeability, A , and inner pressure, P , is expressed by $A = kP^a$, where k is a constant and " a " is the air permeability index. Reference Fig. 2 (attached hereto) shows the variation of air permeability by inner pressure in the cases of $a = 1$, $a > 1$ and $a < 1$.

The present invention is defined in terms such that the limitation of the value of " a " obtained from air permeabilities at 45 kPa and at 55 kPa is 1.2 or higher. Although it is not clear what the actual air permeability index is for the fabric of Nakano, one can make a prediction based on the method of manufacture recited in Nakano Examples 1-7. In the Nakano examples, a pin stenter is used as a setting means for the dried woven fabric. As a result, the yarn shows a small stretching rate even when the inner pressure is increased, so that the edges of the fabric do not enlarge. Thus, the fabric produced has $a < 1$, and the air permeability index cannot fall into any range greater than 1.2, as recited in pending claims 1-6 of the present application. Therefore, the fabrics of Nakano and the present invention are not the same, and the rejection of claims 1-6 should be withdrawn.

With respect to method claims 7-13, the Nakano reference claims a method of making a fabric using a loom equipped with a heald, a reed, and a back roller, and in which the shedding and closing motions of the heald are performed by a drive system having a cam (see Reference Fig. 1 attached hereto). The looms used in the present invention are not disclosed as having a cam (see Specification, page 7, lines 7-9). Moreover, claims 7-13 recite a weaving process limited by having a fiber-filling percentage as defined by formula (3) of 110 or less. The formula shows that the fiber-filling percentage is determined by a combination of the coarseness of the yarn, the density of the fiber and the number and spacing of the wires within the reed, so that different numbers of yarns (stripes) may be present in each space of the reed, depending on the properties of the yarn. (See Reference Fig. 3 attached hereto for a depiction of a reed with two stripes of warp per reed space.) The only reference to reed filling in the Nakano reference is in claim 6, which recites a value of two yarns per reed dent (space) in the selvage.

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The Office Action asserts that the method claims must recite specific process steps other than weaving. Applicants point out that it is sufficient to have only one process step in a method claim. Claims 7-13 recite the weaving of a high density woven fabric with a particular fiber-filling percentage in the reed at the time of the weaving as defined by the formula (3) of 110 or less. This is a proper method claim.

For the foregoing reasons, the present invention as defined by the pending claims is believed to be novel in view of the Nakano reference. In addition, there is nothing in the Nakano reference, or otherwise cited in the Office Action, which would lead one of ordinary skill in the art to modify the disclosure of the Nakano reference in the manner necessary to arrive at the present invention as defined by the pending claims. Accordingly, the present invention also must be considered unobvious in view of the Nakano reference. The anticipation and obviousness rejections, therefore, should be withdrawn.

Conclusion

The application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,



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